

10/018005

217204US2-PCT



IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :
HIJIN SATO ET AL : ATTN: APPLICATION DIVISION
SERIAL NO: 10/018,005 :
FILED: DECEMBER 14, 2001 :
FOR: MULTICAST SERVICE PROVIDING:
SYSTEM, MULTICAST SERVICE
PROVIDING METHOD, INFORMATION
DISTRIBUTING APPARATUS, RADIO
TERMINAL AND RADIO BASE STATION

PRELIMINARY AMENDMENT

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

SIR:

Prior to a first examination on the merits, please amend the above-identified
application as follows:

IN THE CLAIMS

Please cancel original Claims 1-58 without prejudice.

Please add new Claims 59-116 as follows:

59. (New) A multicast service providing system of performing multicast information
distribution service to a radio terminal present within a service area via a radio section from
an information distributing apparatus, wherein:

said radio terminal has service continuation requesting means transmitting to said information distributing apparatus a service continuation request signal for requesting continuation of multicast information distribution service;

said information distributing apparatus has service continuation management means managing as to whether or not the above-mentioned request for service continuation from the radio terminal for the multicast information distribution service has been made; and

said information distributing apparatus transmits to said radio terminal information managed by the service continuation management means has been made indicating whether or not the continuation request for the multicast information distribution service has been made.

60. (New) The multicast service providing system as claimed in claim 59, wherein:

said service management means has management state resetting means resetting a management state thereof into a state that no request for continuation of service for the multicast information distribution service from the radio terminal has been made.

61. (New) The multicast service providing system as claimed in claim 60, wherein:

said management state resetting means performs a resetting operation for the management state every predetermined period.

62. (New) The multicast service providing system as claimed in claim 60, wherein:

said radio terminal has continuation request control means performing a control such that, when the information indicating whether or not continuation request for the multicast information distribution service has been made transmitted from the information distribution apparatus indicates a state that the request has not been made, the service continuation requesting means transmits the service continuation request signal to the information distributing apparatus.

63. (New) The multicast service providing system as claimed in claim 62, wherein:

said continuation request control means controls said service continuation requesting means so that the service continuation request signal is transmitted after a first random time has elapsed since the information indicating the state that no continuation request has been made for the multicast information distribution service was received from said information distributing apparatus.

64. (New) The multicast service providing system as claimed in claim 62, wherein:

said radio terminal has re-transmission control means performing a control such that said service continuation requesting means re-transmits the service continuation request signal to said information distributing apparatus when the information indicating as to whether or not continuation request has been made for the multicast information distribution service has not been changed into information indicating that the request has been made within a predetermined time after the service continuation requesting means transmitted the service continuation request signal.

65. (New) The multicast service providing system as claimed in claim 64, wherein:

said re-transmission control means controls said service continuation requesting means so that the service continuation request signal is transmitted again after a second random time has elapsed after the predetermined time had elapsed since said service continuation requesting means transmitted the service continuation request signal.

66. (New) The multicast service providing system as claimed in claim 64, wherein:

a setting is made such that a time taken since the above-mentioned management state resetting means reset the management state of the service request management means into a state that no request for continuation of service for the multicast information distribution service has been made until the above-mentioned service continuation request means re-

transmits the service continuation request signal be shorter than a time taken since the above-mentioned management state was reset to the state that continuation for a service has not been made from the radio terminal for the multicast information distribution service until the resetting is made subsequently.

67. (New) The multicast service providing system as claimed in claim 59, wherein:

said service continuation management means manages as to whether or not continuation request has been made for the multicast information distribution service by using a flag which is made to be ON when the service continuation request signal is received from the radio terminal.

68. (New) A multicast service providing method, wherein:

when an information distributing apparatus performs multicast information distribution service to a radio terminal present within a service area via a radio section, said information distributing apparatus manages as to whether or not request for service continuation from the radio terminal for the multicast information distribution service has been made, and, also,

transmits thus-managed information indicating whether or not the continuation request for the multicast information distribution service management has been made to the radio terminals, and

said radio terminal transmits a service continuation request signal to said information distributing apparatus when the information transmitted from the information distributing apparatus indicating whether or not service continuation request has been made by said radio terminal for the multicast information distribution service indicates a state that the request has not been made.

69. (New) The multicast service providing method as claimed in claim 68, wherein:

the management state as to whether or not continuation request has been made for the multicast information distribution service from the radio terminal is reset to a state that no continuation request for the multicast information distribution service has been made from the radio terminal, periodically.

70. (New) The multicast service providing method as claimed in claim 68, wherein:

when the information indicating whether or not continuation request has been made for the multicast information distribution service is not changed into a state that the request has been made within a predetermined time after the radio terminal transmitted the service continuation request signal, the service continuation request signal is transmitted to the information distributing apparatus again.

71. (New) An information distributing apparatus which performs multicast information distribution service via a radio section to a radio terminal present within a service area, comprising:

service continuation management means managing as to whether or not service continuation request has been made by the radio terminal for the multicast information distribution service,

information managed by said service continuation management means indicating as to whether or not continuation request for the multicast information distribution service being transmitted to the radio terminal.

72. (New) The information distributing apparatus as claimed in claim 71, wherein:

the service continuation management means has management state resetting means resetting the management state into a state that no service continuation request has been made by the radio terminal for the multicast information distribution service.

73. (New) The information distributing apparatus as claimed in claim 72, wherein:

said management state resetting means performs the resetting operation every predetermined period.

74. (New) A radio terminal which receives multicast information distribution service from an information distributing apparatus via a radio section, comprising:

service continuation request means transmitting a service continuation request signal for requesting provision of the multicast information distribution service, to the information distributing apparatus; and

continuation request control means controlling said service continuation request means so as to cause it to transmit the service continuation request signal to the information distributing apparatus when information indicating whether or not service continuation request has been made by the radio terminal for the multicast information distribution service, transmitted by the information distributing apparatus which manages as to whether or not the service continuation request has been made by the radio terminal for the multicast information distribution service, indicates a state that the request has not been made.

75. (New) The radio terminal as claimed in claim 74, comprising re-transmission control means controlling the service continuation request means so that the service continuation request means re-transmits the service continuation request signal to the information distributing apparatus, when the information indicating whether or not service continuation request has been made by the radio terminal for the multicast information distribution service has not been changed into a state that the request has been made within a predetermined time after the service continuation request means transmitted the service continuation request signal.

76. (New) A multicast service providing method by which multicast information distribution service is performed by an information distributing apparatus via a radio section on radio terminals present in a service area thereof:

wherein:

the information distributing apparatus informs all the radio terminals present in the service area of information for identifying multicast information on distribution and radio channels used for the distribution of the multicast information by using a predetermined radio channel, and

the respective radio terminals within the service area receive the multicast information distribution service from the information distributing apparatus via the thus-informed radio channels.

77. (New) The multicast service providing method as claimed in claim 76, wherein:

the information distributing apparatus manages correspondence relationship between the information for identifying the multicast information on distribution service and the radio channels used for distributing the multicast information, and

informs all the radio terminals present within the service area management information indicating the correspondence relationship by using the above-mentioned predetermined radio channel, and

each of the radio terminals present within the service area receives the desired multicast information distribution service by using the corresponding radio channels based on the management information.

78. (New) The multicast service providing method as claimed in claim 77, wherein:

the radio terminal transmits a service request signal for requesting distribution service of multicast information not included in the management information, to the information distributing apparatus;

when receiving said service request signal from the radio terminal, the information distributing apparatus adds to the management information a correspondence relationship between information identifying the multicast information concerning said request and a radio channel used for distributing the multicast information; and, also

starts distribution service of the multicast information concerning said request by using said radio channel.

79. (New) The multicast service providing method as claimed in claim 76, wherein: the information distributing apparatus informs a continuation check signal for inquiring a necessity of continuation of the multicast information distribution service, to all the radio terminals present in the service area;

when receiving the continuation check signal from the information distributing apparatus, the radio terminal transmits a predetermined response signal to the information distributing apparatus for continuously receiving the multicast information distribution service; and

when receiving the predetermined response signal after transmitting the continuation check signal, the information distributing apparatus continues distributing service of the multicast information concerning the inquiry.

80. (New) The multicast service providing method as claimed in claim 79, wherein: in case the response signal has not been received from any of the radio terminals in response to the continuation check signal within a predetermined time, the information

distributing apparatus terminates distribution service of the multicast information concerning the inquiry.

81. (New) The multicast service providing method as claimed in claim 79, said information distributing apparatus manages correspondence relationship between information identifying the multicast information on distribution service and radio channels used for distributing the multicast information, and transmits management information indicating the correspondence relationship to all the radio terminals present within the service area; and

a correspondence relationship between multicast information for which distribution service is terminated and a radio channel used for distributing the multicast information is deleted from the management information.

82. (New) The multicast service providing method as claimed in claim 79, wherein: said information distributing apparatus manages correspondence relationship between information for identifying multicast information on distribution service and radio channels used for distributing the multicast information, and informs management information indicating the correspondence relationship to all the radio terminals present within the service area by using the predetermined channel; and

deletes a correspondence relationship between information for identifying multicast information for which distribution service is terminated and a radio channel used for distributing the multicast information from the management information.

83. (New) The multicast service providing method as claimed in claim 79, wherein: the radio terminal transmits a reception termination signal to the information distributing apparatus for terminating distribution service of multicast information; and

when receiving the reception termination signal from the radio terminal, the information distributing apparatus informs a continuation check signal for inquiring a necessity of continuation of the multicast information distribution service concerning the distribution service reception termination to all the radio terminals present within the service area.

84. (New) A multicast service providing system in which multicast information distribution service is made by an information distributing apparatus to radio terminals present within a service area via a radio section, wherein:

the information distributing apparatus has information control means informing, by using a predetermined radio channel, all the radio terminals present within the service area, of information for identifying multicast information on distribution service and radio channels used for distributing the multicast information; and

each radio terminal present within the service area receives the multicast information distribution service from the information distributing apparatus by using the radio channels thus informed of.

85. (New) The multicast service providing system as claimed in claim 84, wherein:

the information distributing apparatus has management means managing correspondence relationship between the information identifying the multicast information on distribution service and the radio channels used for distributing the multicast information, and informs, of management information indicating the correspondence relationship, all the radio terminals present within the service area by using a predetermined radio channel; and

each radio terminal present within the service area receives the desired multicast information distribution service from the information distributing apparatus via the corresponding radio channels based on the management information.

86. (New) The multicast service providing system as claimed in claim 85, wherein:
the radio terminal has service requesting means transmitting a service request signal for requesting distribution service for multicast information not included in the management information;

the information distributing apparatus has first management information updating means adding, when receiving said service request signal from the radio terminal, to the management information, a correspondence relationship between information for identifying the multicast information concerning the request and a radio channel used for distributing the multicast information, and

as well as updates the management information by the first management information updating means, starts distribution service of the multicast information concerning the request by using said radio channel.

87. (New) The multicast service providing system as claimed in claim 85, wherein:
the information distributing apparatus has service continuation check means informing all the radio terminals present within the service area of a continuation check signal for inquiring a necessity of continuation of the multicast information distribution service;

the radio terminal has response signal transmission control means transmitting, when receiving the continuation check signal from the information distributing apparatus, a predetermined response signal for continuously receiving the multicast information distribution service; and, further

the information distributing apparatus has service continuation control means continuing, when receiving the predetermined response signal from the service continuation check means after transmitting the service continuation check signal, the multicast information distribution service concerning the inquiry.

88. (New) The multicast service providing system as claimed in claim 87, wherein:

the information distributing apparatus has service termination control means terminating, when the response signal has not been received from any of the radio terminals within a predetermined time in response to the continuation check signal, the multicast information distribution service concerning the inquiry.

89. (New) The multicast service providing system as claimed in claim 87, wherein:

said service continuation check means informs all the radio terminals present within the service area of the continuation check signal as well as information for identifying the multicast information on distribution service and radio channels used for distributing the multicast information by using the predetermined radio channel.

90. (New) The multicast service providing system as claimed in claim 87, wherein:

said information distributing apparatus manages correspondence relationship between information identifying multicast information on distribution service and radio channels used for distributing the multicast information, and informs all the radio terminals present within the service area management information indicating the correspondence relationship by using the predetermined radio channel; and

said information distributing apparatus has second management information updating means deleting a correspondence relationship between information identifying multicast information for which distribution service is terminated and a radio channel used for distributing the multicast information, from the management information.

91. (New) The multicast service providing system as claimed in claim 87, wherein:

the radio terminal has termination control means transmitting, when terminating reception of a multicast information distribution service, a reception termination signal to the information distributing apparatus; and

when receiving the reception termination signal from the radio terminal, the service continuation check means of the information distributing apparatus transmits a continuation check signal for inquiring a necessity of continuation of the multicast information distribution service concerning the distribution service reception termination to all the radio terminals present within the service area.

92. (New) An information distributing apparatus performing multicast information distribution service for radio terminals present within a service area via a radio section, comprising:

informing control means for informing all the radio terminals present within the service area of information for identifying multicast information on distribution service and radio channels used for distributing the multicast information by using a predetermined radio channel,

each of the radio terminals present within the service area being able to receive the multicast information distribution service via the thus-informed radio channels.

93. (New) The information distributing apparatus as claimed in claim 92, comprising:

management means managing correspondence relationship between multicast information on distribution service and radio channels used for distributing the multicast information,

said informing control means informing all the radio terminals present within the service area of management information indicating the correspondence relationship managed by said management means, by using the predetermined radio channel.

94. (New) The information distributing apparatus as claimed in claim 93, wherein:

said management means comprises first management information updating means adding, when receiving a service request signal concerning multicast information for which distribution service has not been made from the radio terminal, a correspondence relationship between information identifying the multicast information concerning the request managed by said management means and a radio channel used for distributing the multicast information, to the management information,

as well as the management information being updated by said first management information updating means, distribution service of the multicast information concerning the request being started by using said radio channel.

95. (New) The information distributing apparatus as claimed in claim 92, comprising:

service continuation check means informing all the radio terminals present within the service area of a continuation check signal for inquiring a necessity of continuation of the multicast information distribution service; and

service continuation control means continuing, when receiving a predetermined response signal after transmitting the service continuation check signal by said service continuation check means, the multicast information distribution service concerning the inquiry.

96. (New) The information distributing apparatus as claimed in claim 95, comprising:

service termination control means terminating, when a response signal has not been received from any one of the radio terminals within a predetermined time in response to the continuation check signal by said service continuation check means, the multicast information distribution service concerning the inquiry.

97. (New) The information distributing apparatus as claimed in claim 95, wherein:

said service continuation check means informs all the radio terminals present within the service area of the continuation check signal as well as information for identifying the multicast information on distribution service and radio channels used for distributing the multicast information by using the predetermined radio channel.

98. (New) The information distributing apparatus as claimed in claim 95, comprising:

said management means managing correspondence relationship between information identifying multicast information on distribution service and radio channels used for distributing the multicast information, and informing all the radio terminals present within the service area management information managed by said management means indicating the correspondence relationship by using the predetermined radio channel; and

second management information updating means deleting a correspondence relationship between information identifying multicast information for which distribution service is terminated and a radio channel used for distributing the multicast information, from the management information.

99. (New) The distributing apparatus as claimed in claim 95, wherein:

when receiving, from the radio terminal receiving multicast information distribution service, a reception termination signal indicating termination of the reception of distribution service, said service continuation check means transmits a continuation check signal for inquiring a necessity of continuation of the multicast information distribution service

concerning the distribution service reception termination to all the radio terminals present within the service area.

100. (New) A radio terminal which receives multicast information distribution service via a radio section from an information distributing apparatus, comprising:

service state reception control means receiving from the information distributing apparatus management information indicating correspondence relationship between information for identifying multicast information on distribution service and radio channels used for distributing the multicast information,

such as to receive from the information distributing apparatus the desired multicast information distribution service via the corresponding radio channels based on the management information received by the service state reception control means.

101. (New) The radio terminal as claimed in claim 100, comprising:

service requesting means transmitting a service request signal for requesting a distribution service for multicast information not included in the management information to the information distributing apparatus,

such that the information distributing apparatus may add, when receiving said service request signal from the radio terminal, to the management information, a correspondence relationship between information for identifying the multicast information concerning the request and a radio channel used for distributing the multicast information, and, also, distribution service of the multicast information concerning the request may be started by using said radio channel.

102. (New) The radio terminal as claimed in claim 100, comprising:

response signal transmission control means transmitting, when receiving a continuation check signal for inquiring a necessity of continuation of multicast information

distribution service from the information distributing apparatus, a predetermined response signal for continuously receiving the multicast information distribution service.

103. (New) The radio terminal as claimed in claim 102, comprising:

termination control means transmitting a reception termination signal to the information distributing apparatus for terminating reception of multicast information distribution service,

such that said information distributing apparatus may inform, when receiving the reception termination signal from the radio terminal, all the radio terminals present within the service area of a continuation check signal for inquiring a necessity of continuation of the multicast information distribution service concerning the distribution service reception termination.

104. (New) A multicast service providing method by which multicast data is distributed to radio terminals from a radio base station, wherein:

the radio terminal which receives the multicast data transmits a distribution request for multicast data to a radio base station on movement destination in case a necessity arises such that the other party of communication be switched from a radio base station on movement origin to the radio base station on movement destination,

the radio base station on movement destination transmits information of a radio channel used for distributing the multicast data to the radio terminal in response to the distribution request given therefrom, and

the radio terminal switches the radio channel based on the information of the radio channel given by the radio base station on movement destination and receives the multicast data from the radio base station on movement destination.

105. (New) The multicast service providing method as claimed in claim 104,

wherein:

the radio terminal transmits the distribution request for the multicast data to the radio base station on movement origin, and the distribution request for the multicast data is transmitted to the radio base station on movement destination via the radio base station on movement origin.

106. (New) The multicast service providing method as claimed in claim 104,

wherein:

in case the radio terminal cannot receive information of the radio channel to be used for distributing the multicast data within a predetermined time after transmitting the distribution request, the radio terminal transmits the distributing request again.

107. (New) The multicast service providing method as claimed in claim 104,

wherein:

the radio terminal transmits the distribution request several times.

108. (New) The multicast service providing method as claimed in claim 104,

wherein:

the radio base station on movement origin obtains information concerning multicast data distributed by an adjacent radio base station, and transmits the information concerning the multicast data, and

in case the radio terminal determines that the radio base station on movement destination does not distribute the desired multicast data based on the information concerning the multicast data given by the radio base station on movement origin, the radio terminal transmits the distribution request to the radio base station on movement destination or the

radio base station on movement origin so that the distribution request may be received by the radio base station on movement destination.

109. (New) A radio base station which transmits multicast data to a radio terminal, comprising:

distribution request receiving means receiving a distribution request for multicast data transmitted from the radio terminal, and

radio channel information transmitting means transmitting information of a radio channel used for distributing the multicast data in response to the distributing request for the multicast data given by the radio terminal.

110. (New) The radio base station as claimed in claim 109, wherein:

the distribution request receiving means receives the distribution request for multicast data transmitted from the radio terminal via another radio base station.

111. (New) The radio base station as claimed in claim 109, wherein:

the distribution request receiving means comprises information obtaining means obtaining information concerning multicast data transmitted from a radio base station adjacent thereto, and

multicast information transmitting means transmitting the information concerning the multicast information.

112. (New) A radio terminal which receives multicast data distributed by a radio base station, comprising:

distribution request transmitting means transmitting a distribution request for multicast data to a radio base station on movement destination in case a necessity arises such that the other party of communication be switched from a radio base station on movement origin to the radio base station on movement destination, and

multicast data reception control means for switching a radio channel based on information concerning a radio channel used for distributing the multicast data transmitted from the radio base station on movement destination in response to the distribution request so as to receive the multicast data distributed from the radio base station on movement destination.

113. (New) The radio terminal as claimed in claim 112, wherein:

the distribution request transmitting means transmits the distribution request for the multicast data to the radio base station on movement origin so that the distribution request for the multicast data be transmitted to the radio base station on movement destination via the radio base station on movement origin.

114. (New) The radio terminal as claimed in claim 112, wherein:

the request transmitting means transmits the distribution request again in case information concerning the radio channel to be used for distributing the multicast data cannot be received within a predetermined time after transmitting the distributing request.

115. (New) The radio terminal as claimed in claim 112, wherein:

the distribution request transmitting means transmits the distribution request several times.

116. (New) The radio terminal as claimed in claim 112, wherein:

the distribution request transmitting means transmits the distribution request to the radio base station on movement destination or the radio base station on destination origin so that the distribution request for the multicast data be received by the radio base station on movement destination in case the distribution request transmitting means determines that the radio base station on movement destination does not distribute the desired multicast data

based on information, received from the radio base station on movement origin, concerning multicast information distributed from the radio base station adjacent to the station.

REMARKS

Favorable consideration of this application, as presently amended, is respectfully requested.

The present Preliminary Amendment is submitted to place the above-identified application in more proper format under United States practice and to correct for informalities in the claims.

By the present Preliminary Amendment each of original Claims 1-58 is cancelled and new Claims 59-116 are presented for examination. New Claims 59-116 correspond to respective original Claims 1-58 except for certain minor differences.

First, original Claims 1-58 contained two informalities in their claim numbering in that original Claims 1-58 did not present a numbered Claim 29 and presented two numbered Claims 51. New Claims 59-116 correct for those improper numberings in original Claims 1-58.

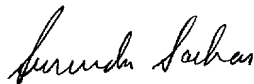
Further, new Claims 59-116 do not recite any improper multiple dependencies.

Outside of the above-noted changes, new Claims 59-116 correspond to original Claims 1-58.

The present application is believed to be in condition for a full and thorough examination on the merits. An early and favorable consideration of the present application is hereby respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



Gregory J. Maier
Attorney of Record
Registration No. 25,599
Surinder Sachar
Registration No. 34,423



22850

Tel.: (703) 413-3000

Fax: (703) 413-2220

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Serial No:

10/018,005

Amendment Filed on:

3-25-2002

IN THE CLAIMS

Claims 1-58 (Cancelled).

Claims 59-116 (New).